

AUTOMATIC PAPER FEED APPARATUS

BACKGROUND OF THE INVENTION

[0001] The present invention relates to an automatic paper feed apparatus for paper,
5 especially a medicine bag.

[0002] Conventionally, an automatic paper feed apparatus having, for example, the following construction has been known.

[0003] Japanese Laid-open patent publication No. 49-67620 discloses an automatic paper feed apparatus in which a brake piece is provided on one end portion of copy papers stacked on
10 the-a paper feed table to prevent the two copy papers from being conveyed at a time.

[0004] Japanese Laid-open patent publication No.58-69645 discloses an automatic paper feed apparatus in which plates are interposed between stacked papers. ~~The friction~~ A frictional coefficient between each plate and each paper is smaller than that between adjacent papers, thereby preventing the papers from being fed in an overlapped state.

15 [0005] In the former automatic paper feed apparatus, the brake piece have has to be provided on each copy paper. In addition, a solenoid and so-on the like is necessary to lift the brake piece so that the copy papers can be discharged from the paper feed table one by one. Thus, there has been a disadvantage in that it use of this brake piece complicates the construction and invites-increases cost-up.

20 [0006] On the other hand, in the latter automatic paper feed apparatus, a complicated operation for interposing the plate plates between papers has been necessary.



SUMMARY OF THE INVENTION

[0007] An object of the invention is to provide an automatic paper feed apparatus which can reliably prevent papers from being discharged in an overlapped state in spite of simple construction.

5 [0008] In order to achieve the object, the present invention provides an automatic paper feed apparatus comprising a paper feed roller for automatically feeding a plurality of papers in order from an uppermost one, with the plurality of papers being contained in a cassette in a stacked state, wherein a holding member having flexibility is provided so that the holding member comes into contact with the an uppermost paper to generate a friction force weaker than
10 that between the paper feed roller and the this paper.

15 [0009] According to the above construction, when the paper positioned uppermost is conveyed by the paper feed roller, the holding member also comes into contact with the next paper to generate a friction force, thereby preventing the next paper from being conveyed together with the uppermost paper. As the holding member has a flexibility itself, it surely comes into close contact with the paper along the a surface of the paper and generates a uniform friction force, thereby properly preventing any trouble of paper feed caused by the paper feed roller.

20 [0010] Preferably, an engagement portion is formed on the a rear end portion of the holding member, and wherein the engagement member portion is engaged with the cassette, whereby the holding member is attached on the cassette slidably with respect to a paper feed direction. In this case, the engagement member portion may be engaged with a guide portion which is provided in the cassette to guide the a rear end of the paper.

[0011] According to the above construction, when the paper feed roller rotates, the a paper positioned uppermost commences moving due to a friction force between the paper and the paper feed roller. Since the this uppermost paper moves together with the holding member put

positioned thereon, it is possible to generate a proper friction force between the paper feed roller and the paper. Therefore, smooth conveyance of the paper is made possible.

[0012] Even if the paper is a medicine bag and has a different thickness by location, the holding member becomes deformed along ~~the-a~~ surface of the medicine bags~~-bag~~ and ~~the-a~~ friction force to be generated becomes uniform, thereby allowing the medicine bag to ~~eonvey~~ be smoothly conveyed.

[0013] Preferably, the holding member has a sheet-like shape, ~~and~~ wherein conductive layers comprising different material are formed on ~~the~~ top and bottom surfaces of the holding member. Thus, it is possible to select any proper one of the top and bottom faces based on ~~difference~~ differences of paper to be conveyed, and have such face come into contact with the paper.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] Further objects and advantages of the present invention will become clear from the following description taken in conjunction with the preferred embodiments thereof with reference to the accompanying drawings, in which:

[0015] Fig. 1 is a side view of a medicine bag printing apparatus according to an embodiment of the present invention;

[0016] Fig. 2 is a front view of the medicine bag printing apparatus of Fig. 1;

[0017] Fig. 3 is a perspective view showing a medicine bag in a state before completion as an example of ~~the-a~~ paper;

[0018] Fig. 4 is a front sectional view of a cassette mounted on the medicine bag printing apparatus of Figs. 1 and 2;

[0019] Fig. 5 is a side sectional view of the cassette of Fig. 4;

- [0020] Fig. 6 is a partly enlarged view of Fig. 5;
- [0021] Fig. 7 is a perspective view of ~~the~~a flexible sheet of Figs. 4 and 5; and
- [0022] Fig. 8 is an enlarged sectional view of the flexible sheet of Fig. 6.

5 DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0023] Hereinbelow, embodiments of the invention will be described with reference to the accompanying drawings.

[0024] Figs. 1 and 2 show a medicine bag printing apparatus according to an embodiment of the present invention. The medicine bag printing apparatus ~~comprising~~comprises an automatic paper feed apparatus 1 and a printing apparatus 3 for conducting a predetermined print on a paper 2 fed from the automatic paper feed apparatus 1. In this embodiment, a medicine bag (refer to Fig. 3) of which both side edges are stuck and become thick is used as ~~a~~the paper 2.

[0025] In the automatic paper feed apparatus 1, a ~~cassettes~~cassette 5 can be mounted into and dismounted from each of housing spaces 4 formed in a multistage in a vertical direction. As shown in Fig. 5, in each housing space 4 is provided a paper feed roller 6 which is driven to rotate by a ~~drive means device~~ such as motor (not shown). The paper feed roller 6 comes into contact with the paper 2 contained in the cassette 5 and positioned uppermost so that the paper 2 is conveyed and fed due to a friction force generated between ~~both~~the feed roller and the paper. (Hereinafter, a direction in which the paper is fed is referred to as "front" and a reverse direction thereof is referred to as "rear".)

[0026] The cassette 5 has a box like shape with an upper surface opened as shown in Figs. 4 and 5. On ~~the~~a front end face of the cassette 5 is formed an engagement recess 7 with which fingers of an operator are engaged when the cassette 5 is drawn from ~~the~~ housing space 4. On ~~the~~a bottom of the cassette 5, a support plate 20 is provided pivotably around a support shaft

10 via arms 11. The A flat portion 8 of the support plate 20 positioned on ~~the-a~~ front end side is urged upward-upwardly by a spring 9. On the support plate 20, guide plates 12 are slidably provided in a width direction to guide ~~the~~ both side edges of the paper 2 contained in the cassette 5. On ~~the-an~~ upper face of the flat portion 8 of the support plate 20, guide protrusions 13 are formed to support a middle portion of the medicine bag, i.e., a thinner portion than ~~the~~ side edge portions thereof. On ~~the-a~~ bottom of the cassette 5 on ~~the-a~~ rear side, a guide piece 14 is slidably provided in ~~the-a~~ paper feed direction to guide ~~the-a~~ rear end of the paper 2. ~~on the~~ On an upper end of the guide piece 14 is formed an engagement ~~raw-claw~~ 15 protruding toward ~~the-a~~ front side.

10 [0027] In the cassette 5, the same size of papers 2 are contained in a stacked state. (The size of papers 2 contained in each of the cassettes 5 is the same in one case but different in another case.) The papers 2 are sandwiched between the support plate 20 urged upward-upwardly by the spring 9 and the paper feed roller 6 in a state that the cassette 5 is mounted in the housing space 4.

15 [0028] On ~~the-a~~ rear side of the paper feed roller 6, a flexible or flaccid sheet 16 as an example of ~~the-a~~ holding member of the present invention is put on the paper 2 contained in the cassette 5. The flexible sheet 16 as shown in Fig. 7 is made of urethane rubber, silicon rubber and so on or the like. The flexible sheet 16 comes into close contact with the paper 2 in an area except a portion pressed by the paper feed roller 6. ~~on the~~ On a rear end of the flexible sheet 16 is integrally formed an attachment piece 17 that is made of metal material such as stainless steel and has a rectangular shape. In the attachment piece 17 is formed a rectangular engagement hole 18 into which the guide piece 14 is inserted so that the flexible sheet 16 is slidably attached in the paper feed direction of the paper 2.

[0029] In the medicine bag printing apparatus of above construction, the paper feed roller 6 is driven to rotate in the housing space 4 in which the is mounted cassette 5 containing the papers 2 of size corresponding to a prescription data is mounted. At this time, a friction force is generated between the paper feed roller 6 and the an uppermost paper 2 urged upward upwardly by the spring 9. The A spring force exerted by the spring is large in comparison to the a weight of the flexible sheet 16 which comes into close contact with the upper most uppermost paper 2. Therefore, the uppermost paper 2 and the flexible sheet 16 commence moving together as the paper feed roller 6 rotates. Thus, in comparison to a case that no flexible sheet is put on provided, the a state of conveying the paper 2 becomes stable. That is, in the a case of only paper 10 2, there is a possibility that the paper 2 is conveyed on the with a skew according to a slight difference of condition such as a contact condition between the paper 2 and the paper feed roller 6. On the other hand, in the case that the flexible sheet is put on provided, since an influence of the weight of the flexible sheet becomes larger, no bad influence is exerted to the conveyance of the paper 2 even if a condition is slightly different, for example, a contact pressure between the 15 paper 2 and the paper feed roller 6 is different in the a width direction.

[0030] When the rotation of the paper feed roller 6 allows the paper 2 and the flexible sheet 16 to move, the an edge of the engagement hole 18 of the attachment piece 17 comes into contact with the guide piece 14, thereby inhibiting the flexible sheet 16 from moving further. The friction force generated between the paper feed roller 6 and the uppermost paper 2 is larger than the a friction force generated between the paper 2 and the flexible sheet 16 which comes into close contact with the paper 2. Therefore, only the paper 2 keeps moving. Moving Movement of only the uppermost paper 2 allows a part of the flexible sheet 16 to come into close contact with the a surface of the next paper 2 as shown in Fig. 6. The friction A frictional coefficient between the paper 2 and the flexible sheet 17-16 is larger than the friction a frictional coefficient

between the adjacent papers 2. Therefore, the next paper 2 is prevented from being moved by the a friction force from of the flexible sheet 16, whereby only the paper 2 positioned uppermost can be conveyed as the paper feed roller rotates.

[0031] Thus, in the embodiment explained above, putting the flexible sheet 16 on the stacked paper 2 enables to neglect be neglected a slight difference of condition that has been a problem when conveying the paper 2 by the paper feed roller 6, resulting in good conveyance of the paper 2. Therefore, the paper 2 can be conveyed stably on the and straight. Even in a case of printing, the a printing direction never skews. In addition, after commencement of conveying, the flexible sheet 16 holds the next paper 2, thereby preventing a disadvantage in that the papers 10 2 are conveyed in a overlapped state.

[0032] In the embodiment described above, the flexible sheet 16 is explained as an example of the holding member, though the holding member may be a plurality of line-like members or straps, or may also be a mesh-like member. Also, the holding member may be a sheet-like member with a various kind kinds of shape shapes formed on the a surface thereof. 15 Moreover, it is also possible to stick an other member, such as sponge, on the a surface of the holding member to generate a predetermined friction force between such member and the paper 2.

[0033] In addition, a coating of conductive material may be applied on the a top face of the flexible sheet 16, or carbon and so on or the like may be impregnated in the a surface of the flexible sheet 16, thereby preventing a bad influence due to a static electricity generated on the 20 paper 2. In this case, as shown in Fig. 8, coatings 16a and 16b of different conductive material (for example, carbon and aluminum) may be preferably applied on the top and bottom faces of the flexible sheet 16 to use be used either according to the a difference (for example, normal quality paper and propylene) of the paper 2 to be used.

[0034] As is clear from the above description, according to the present invention, as the because a flexible sheet is put on the paper in the-a cassette, it is possible to reliably feed only one paper.

[0035] Although the present invention has been fully described by way of the examples 5 with reference to the accompanying drawing drawings, it is to be noted that various changes and modifications will be apparent to those skilled in the art. Therefore, unless such changes and modifications otherwise depart from the spirit and scope of the present invention, they should be construed as being included therein.

ABSTRACT OF THE DISCLOSURE

The present invention provides an automatic paper feed apparatus which can reliably prevent papers from being discharged in an overlapped state in spite of simple construction. The automatic paper feed apparatus comprises a paper feed roller 6-for automatically feeding a plurality of papers 2-in order from an uppermost one, with the plurality of papers 2-being contained in a cassette 5-in a stacked state. A holding member 16-having flexibility is provided so that the holding member 16-comes into contact with the uppermost paper 2-to generate a friction force that is weaker than that between the paper feed roller 6-and the uppermost paper-2.